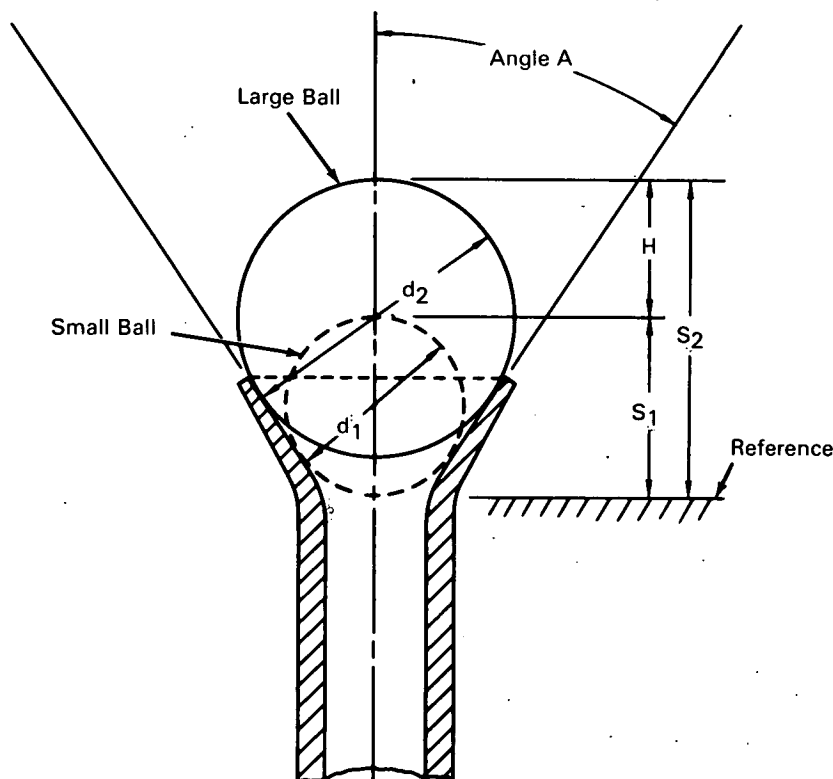


NASA TECH BRIEF



NASA Tech Briefs are issued to summarize specific innovations derived from the U.S. space program, to encourage their commercial application. Copies are available to the public at 15 cents each from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia 22151.

Flare Angles Measured with Ball Gage



Tubing joints have always been subject to leakage problems wherever high pressures, extreme temperature gradients, or excessive vibration have been involved. As a result, it is necessary to fabricate flared joints to very exacting standards and this requires precise means of measuring the internal angle of the planes. Prior methods involved making of a plaster or plastic cast of the internal flare and then inspecting the cast on an optical comparator.

A new method has been devised that uses precision tungsten carbide balls to measure the internal flare angle. Measurement is made by placing a small ball

into the throat of the flare, as shown in the sketch. The distance S_1 from the top of the ball to an external reference point is then measured. A larger ball is then placed in the flare and the distance S_2 from the top of the ball to the same reference point is measured. The difference H in distances ($S_2 - S_1$) to the reference point, and the difference in diameters d_1 and d_2 of the two balls determine the average slope of the flare between the points of ball contact. Thus, the required angle A is determined by:

$$\text{Cosec } \frac{A}{2} = \frac{2H}{d_2 - d_1} - 1.$$

(continued overleaf)

Note:

Inquiries concerning this invention may be directed to:

Technology Utilization Officer
Marshall Space Flight Center
Huntsville, Alabama 35812
Reference: B68-10030

Patent status:

This invention has been patented by NASA (U.S. Patent No. 3,360,864), and royalty-free license rights will be granted for its commercial development. Inquiries about obtaining a license should be addressed to NASA, Code GP, Washington, D.C. 20546.

Source: David Cleghorn and William A. Wall
(MFS-14690)